

Name Answer Key

WSU ID# _____

Math 364 Quiz – Week #9

1. Describe the feasible region given by the following set of constraints, where a, b, c, d are given scalars.

$$a(1-y) + cy \leq x \leq b(1-y) + dy, \quad x \in \mathbb{R}, \quad y \in \{0, 1\}$$

When $y=0$, $a \leq x \leq b$

When $y=1$, $c \leq x \leq d$

The value of binary variable y determines which of two distinct box constraints is applied to variable x .

2. (Extra Credit) Describe a real-world application where this type of constraint on variable x is relevant.

There are myriad possibilities. One example – extracted from one of the quiz responses – is:

"Suppose, as part of a larger parks maintenance program, we can choose to water a lawn in the morning ($y=0$) or evening ($y=1$). In the morning we may need to use $a \leq x \leq b$ gallons of water, but in the evening we may need to use $c \leq x \leq d$ gallons."